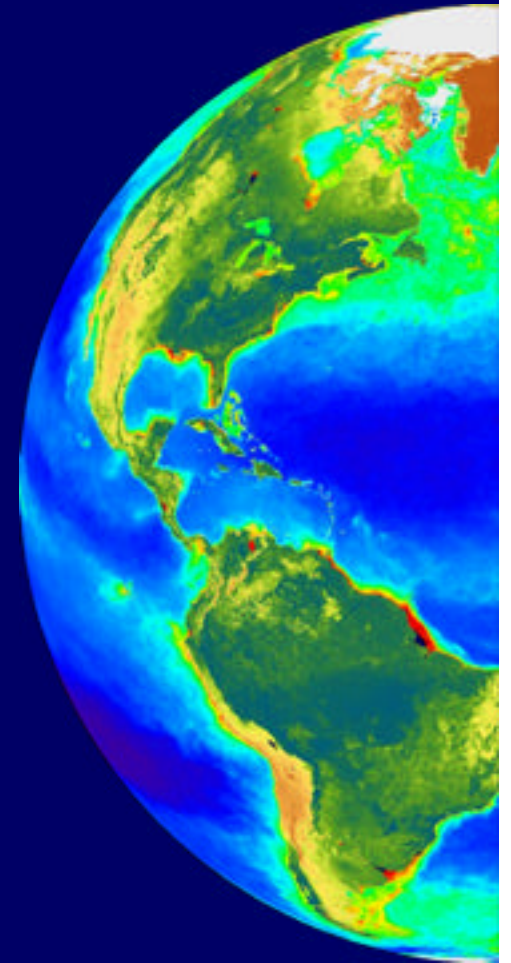




Science: How is the Earth Changing and What Are the Consequences for Life on Earth?

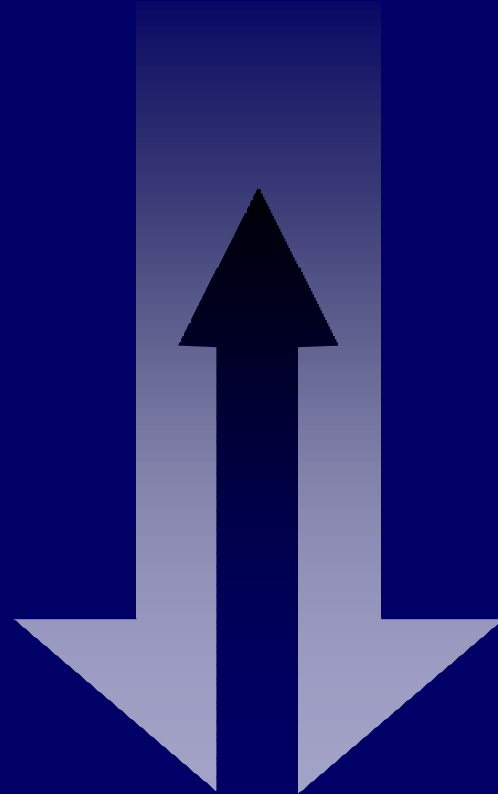
- How is the global Earth system changing?
- What are the primary causes of change in the Earth system?
- How does the Earth system respond to natural and human-induced changes?
- What are the consequences of changes in the Earth system for human civilization?
- How well can we predict future changes to the Earth system?





Establishing Priorities

Science Priority Criteria



Science Return
Benefit to Society
Mandated Program
Appropriate for NASA
Partnership Opportunity*
Technology Readiness
Program Balance
Cost / Budget Context

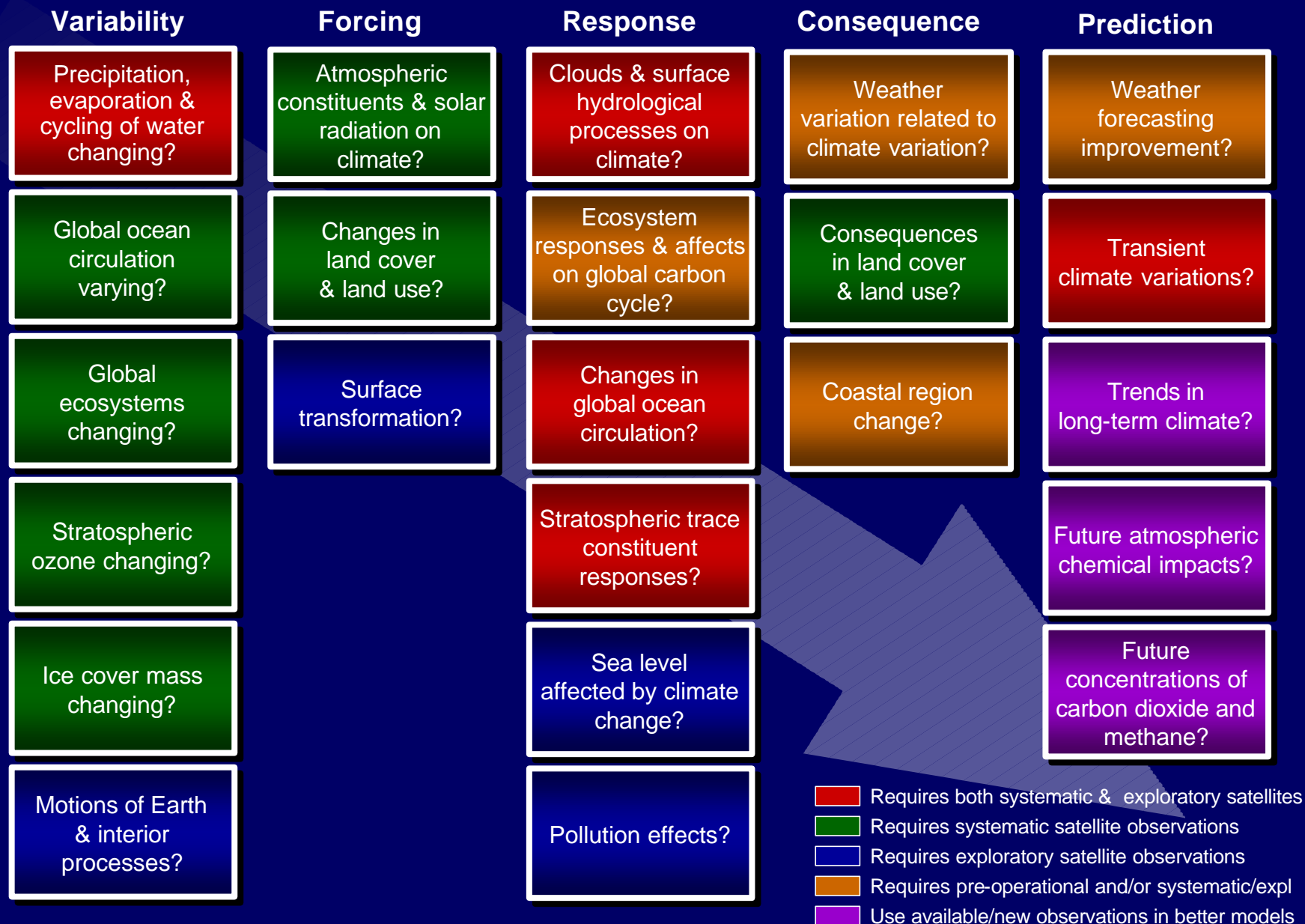
Implementation Priority Criteria

* Includes potential for handoff to operational systems





Deriving Measurement Requirements from the Research Strategy





Exploratory Measurement Needs

How are global precipitation, evaporation, and the cycling of water changing? (V1)

What are the motions of the Earth and Earth's interior? (V6)

What trends in atmospheric constituents and solar radiation are driving global climate? (F1)

How is the Earth's surface being transformed...? (F2)

What are the effects of clouds and surface hydrological processes on climate change? (R1)

How do ecosystems respond to and affect global environmental change and the global carbon cycle? (R2)

How can climate variations induce changes in global ocean circulation? (R3)

How do stratospheric trace constituents respond to change in climate and chemical composition? (R4)

How is global sea level affected by climate change? (R5)

What are the effects of regional pollution on the global atmosphere...? (R6)

Soil moisture

Gravity field (*GRACE*)

Stratospheric aerosols (*PICASSO*)

Land surface topography/deformation

Cloud particle properties (*Cloudsat*)

Snow cover/Freeze-thaw transition

Biomass changes (*VCL*)

Carbon sources & sinks

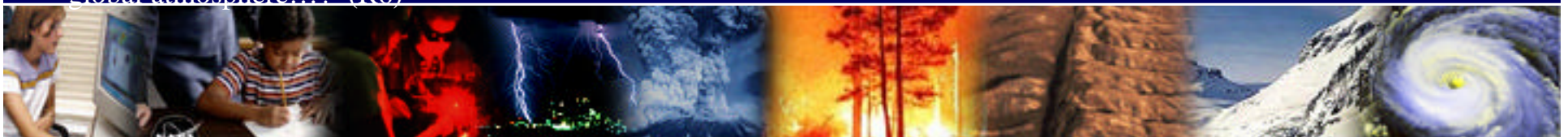
Ocean salinity

Sea ice thickness

Atmospheric properties in tropopause region

Ice sheet velocity fields

Tropospheric ozone & precursors





Deriving Measurement Requirements from the Research Strategy





We Will Examine Practically Every Aspect of
the Earth System From Space in This Decade

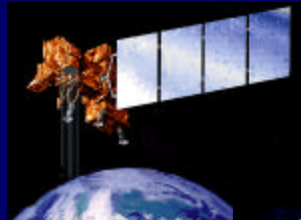
Systematic Missions - Observation of Key Earth System Interactions



Terra



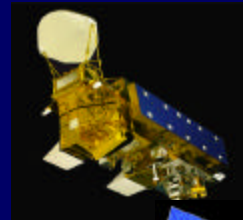
QuikSCAT



Landsat 7



ICESat



Aqua

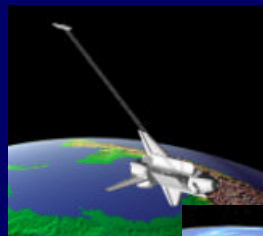


Jason-1



Aura

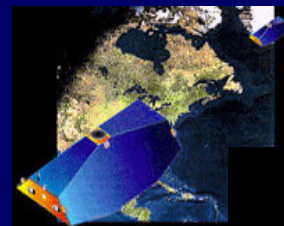
Exploratory - Explore Specific Earth System Processes and Parameters and Demonstrate Technologies



SRTM



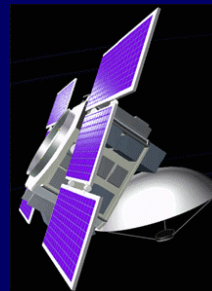
VCL



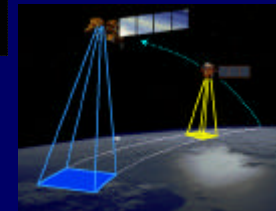
GRACE



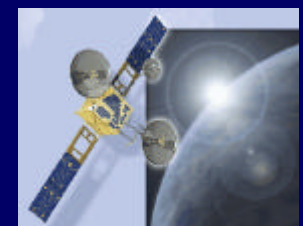
PICASSO



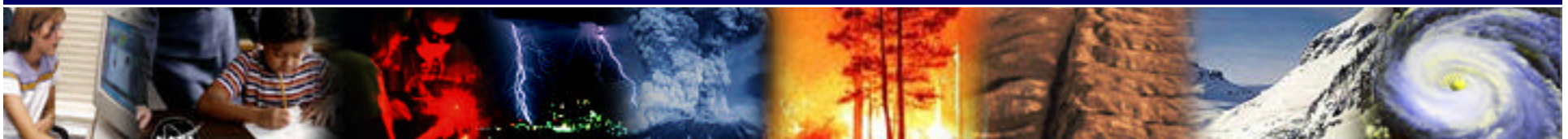
Cloudsat



EO-1

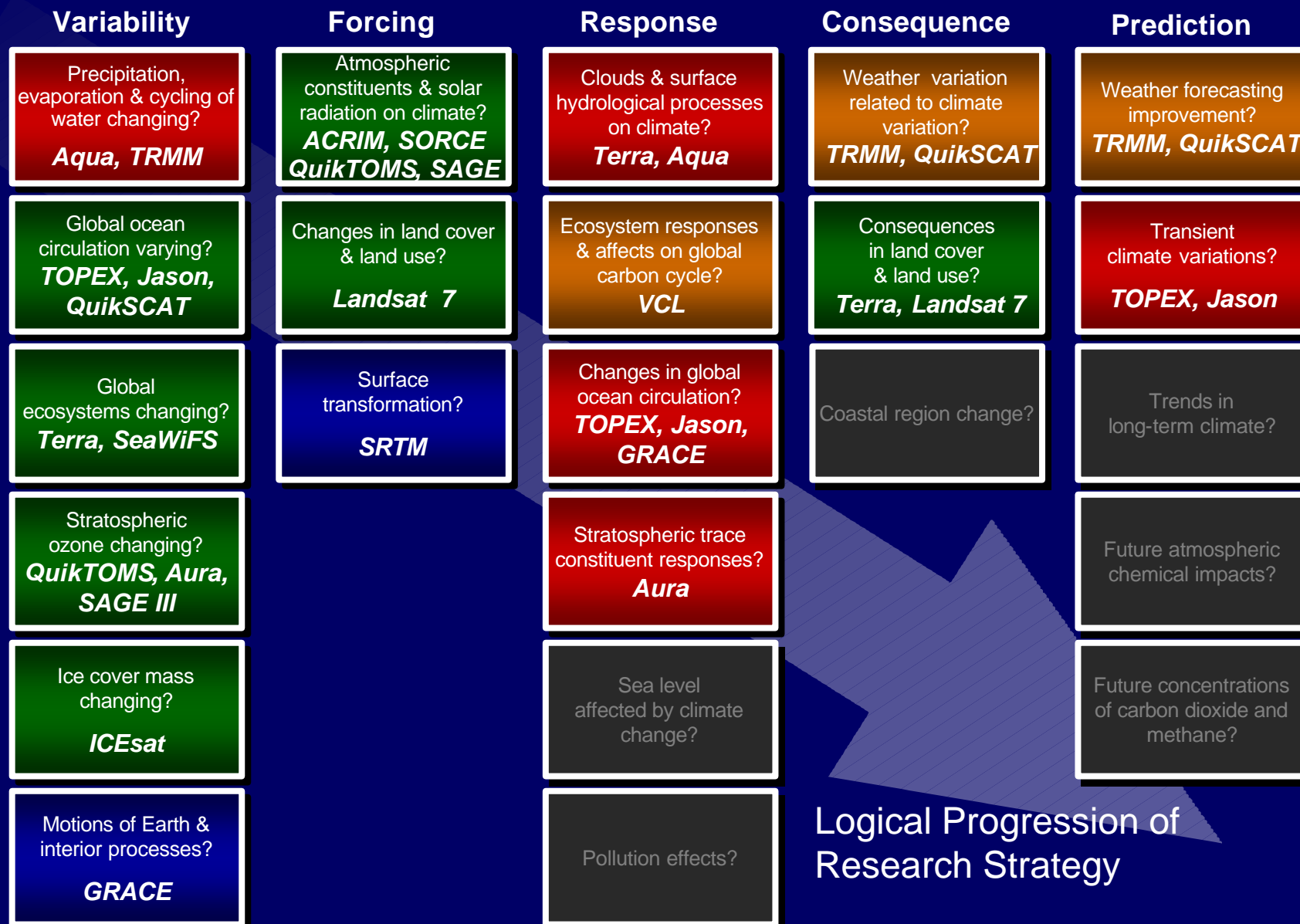


EO-3





Science Questions Addressed by EOS Era Missions





Systematic Measurement Missions

EOS Era

Terra, Aqua

Landsat 7

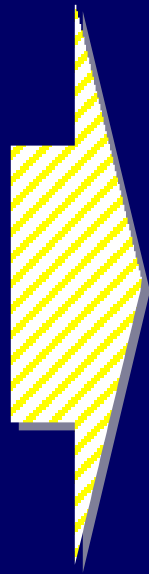
TRMM

TOPEX, Jason

QuikSCAT, SeaWinds

TOMS, OMI

ACRIMSAT, SORCE

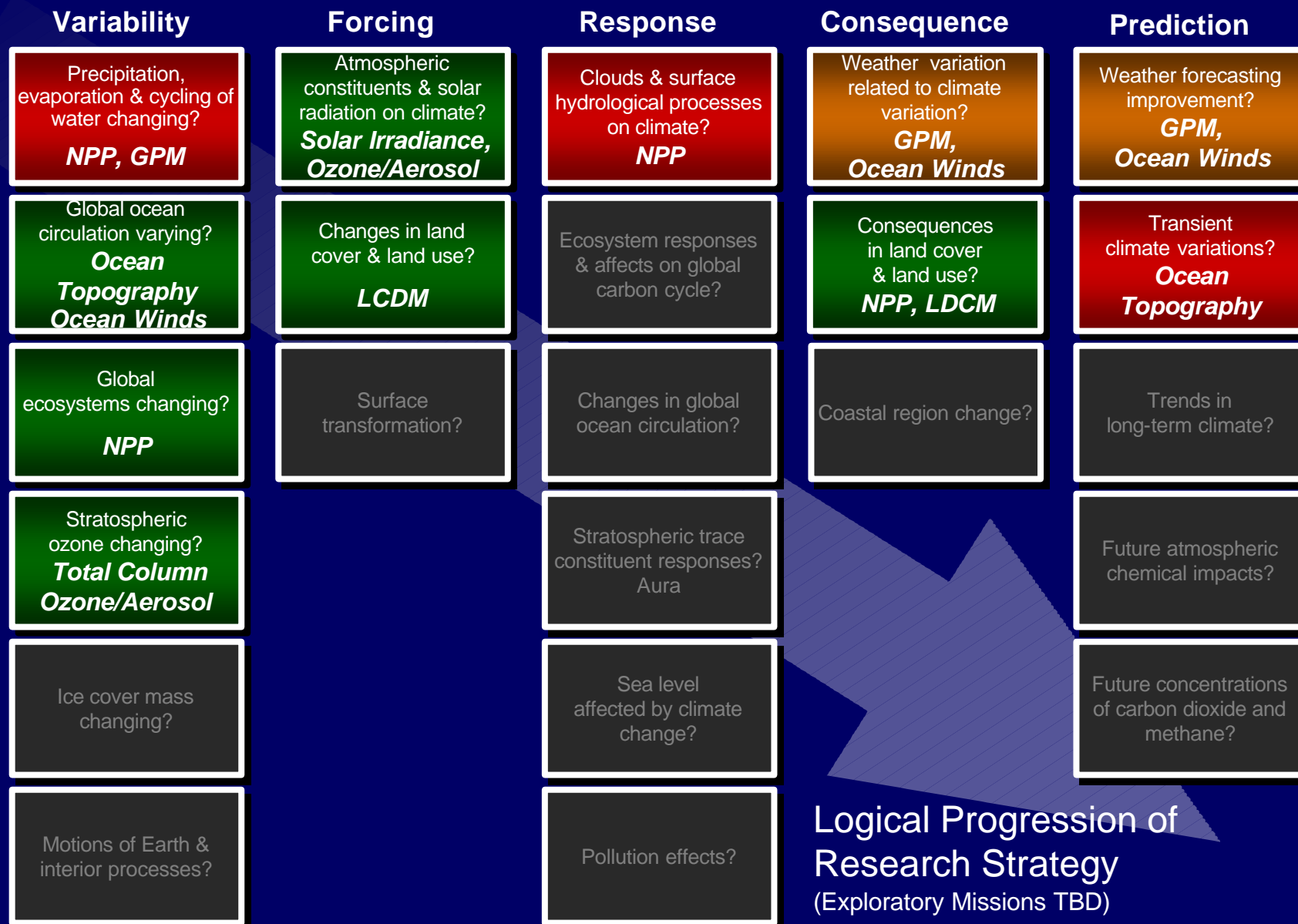


- **NPOESS Preparatory Project (2005/06)**
- **Landsat Data Continuity Mission (2005)**
- **Global Precipitation Mission (2007)**
- **Ocean Topography Mission (2006)**
- **Ocean Surface Winds (2006)**
- **Total Column Ozone/Aerosols (2008)**
- **Solar Irradiance (2006)**





Science Questions Addressed by EOS Follow-on Missions





Step Two Proposal: SCIENCE CONTENT

- Science is still the primary filter in the ESSP evaluation process
- Respond to issues cited by the Step One evaluation
- Clearly identify changes to the science content from the Step One proposal

